

STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

Marion Telephone, LLC

Petition for Arbitration of Certain
Terms And Conditions of Proposed
Agreement With Verizon North Inc.
(f/k/a GTE North Incorporated) and
Verizon South Inc.(f/k/a GTE South
Incorporated) Concerning
Interconnection Under the
Telecommunications Act of 1996

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DOCKET NO. 06-0688

DIRECT TESTIMONY OF WARREN THOMAS
ON BEHALF OF
Verizon North Inc.
and Verizon South Inc.

EXHIBIT 2.0

****PUBLIC VERSION****

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Witness _____

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1 **INTRODUCTION**

2 **Q. Please state your name, your employer, your business address and on**
3 **whose behalf you are offering this testimony.**

4
5 A. My name is Warren Thomas. I am employed by Verizon Services Corporation in
6 its engineering and technology division as a manager responsible for network
7 engineering, central office engineering and project management. My business
8 address is One East Pratt Street, Baltimore, Maryland 21202. I am providing
9 testimony in this proceeding on behalf of Verizon North, Inc. and Verizon South,
10 Inc. (collectively "Verizon").

11 **Q. Briefly state your educational background.**

12
13 A. I received a Bachelor of Science degree in Electrical Engineering in 1989 from
14 Morgan State University in Baltimore, Maryland.

15 **Q. Please state your previous work experience in the area of**
16 **telecommunications.**

17
18 A. I have worked for Verizon and its predecessor companies since 1989. I have
19 held management engineering positions in Outside Plant Engineering, Outside
20 Plant Planning, Finance and Capital Recovery, Digital Switch Engineering, and
21 DC Power Plant & Main Distribution Frame ("MDF") Planning and Engineering. I
22 have held management positions in Central Office Field Engineering, Central
23 Office Equipment Engineering, and Central Office Staff Support for Methods &
24 Procedures documentation and Processes Development.

PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to address network-related issues raised in the Petition for Arbitration filed by Marion Telephone LLC ("Marion") in this proceeding. Specifically, I will demonstrate that Verizon should be able to employ direct end office trunking when the traffic originated by Marion's customers to a particular tandem exceeds 240 trunks (Issue 14); Marion's proposal to directly connect metallic cables to MDFs in Verizon Central Offices ("COs") is not technically feasible due to technical and operational concerns (Issue 15); and Verizon should be entitled to restrict to 100 feet the length of new facilities that must be installed to connect Marion's Telecommunications Outside Plant Interconnect Cabinet ("TOPIC") to Feeder Distribution Interfaces ("FDIs") within Verizon's network (Issue 18).

As I will discuss in further detail below, the Administrative Law Judge ("ALJ") and the Illinois Commerce Commission ("Commission") should decide each of these issues in Verizon's favor and reject the modifications Marion has proposed to Verizon's interconnection agreement ("ICA") language that purport to support Marion's position on each of these issues.

DISCUSSION

ISSUE 14

Q. Do Marion and Verizon agree on the manner in which Issue 14 should be framed?

A. No. Marion believes that the issue should be stated as follows:

In Section 2.3 of the Interconnection Attachment ("One Way Interconnection Trunks"), is it reasonable for Verizon to limit the total number of tandem interconnection trunks to a maximum of 240 trunks?

Verizon, on the other hand, states the issue as follows:

May Marion require Verizon to route all traffic through its tandem, or may Verizon employ direct end office trunking where the traffic to a particular tandem exceeds 240 trunks?

Q. Why is Verizon's statement of the issue more appropriate?

A. Because Verizon's statement of the issue better reflects the division of responsibility that will be required with respect to the deployment of Direct End Office Trunks ("DEOTs") when the addition of such trunks are warranted under Verizon's proposed ICA language.

Q. Before you address the 240 trunk limit, are there any observations you would like to make with respect to the redline version of Verizon's Model Interconnection Agreement that Marion filed with its Petition for Arbitration?

A. Yes. In the redline of Verizon's model ICA that Marion submitted with its Petition for Arbitration, Marion Telephone incorrectly identified the section of the model ICA that references the tandem limitation under discussion. Verizon's model ICA identifies the section as 2.2.6. Section 2.2.6 discusses the tandem limit of 240 trunks, equivalent to 240 DS0's or 10 DS1's. Section 2.2.6 of the Model ICA

79 discusses (1) limiting the interconnection trunks assigned to the tandem switch,
80 (2) when exceptions to this limit are acceptable, and (3) options for Verizon to

81 use its end office switches to maximize the efficiency of the tandem switch.

82 **Q. What is your understanding of Marion's position on this issue?**

83 A. My understanding is that Marion believes that it is inappropriate for the ICA to
84 include any restriction on the number of trunks that it can utilize to interconnect
85 with a Verizon tandem.

86 **Q. Do you believe that Marion's position is based on concerns that it will be**
87 **required to incur costs to directly interconnect with Verizon end offices**
88 **when the tandem threshold of 240 trunks is exceeded?**

89
90 A. No. I understand that Marion was informed that Verizon's language would not
91 require Marion to pay for direct trunking when the traffic volume at the tandem
92 exceeds the 240 trunk capacity. While the section that Marion proposes to
93 eliminate would obligate Marion to place an order for direct end office trunks the
94 ICA would not require Marion to pay for these trunks for the carriage of local
95 traffic. In other words, Marion would not be required to establish and pay for its
96 own transport of local traffic to those end offices, nor would it be required to
97 establish collocation in those end offices. There would be no change in the
98 parties' responsibilities with respect to intercarrier compensation; they would
99 continue to pay the same rates they do today for termination of local traffic that
100 traverse the trunks.

101 **Q. If Marion would not be required to pay for the end-office trunking, what**
102 **reason would it have to oppose this request?**
103

104 A. My surmise is that Marion would find it easier to simply dump all of its traffic at a
105 single point (the tandem), rather than having to go to the trouble of routing the
106 traffic appropriately, towards the end office for which it is destined. As set forth
107 below, however, that is not a legitimate reason: Although it might make Marion's
108 job slightly more convenient, it would result in an inefficient use of network
109 resources, and could lead to the premature exhaust of network resources. Given
110 that Marion would not be required to pay for the trunk facilities and would only be
111 required to place an Access Service Request ("ASR") order for trunking when
112 warranted, Marion has no legitimate reason to oppose the tandem trunking
113 restriction.

114 **Q. Is it considered a sound practice within the industry for a CLEC to send an**
115 **unlimited amount of traffic through tandem interconnections?**

116
117 A. No, it is not. Generally speaking, accepted engineering practices seek to
118 minimize the use of network resources, consistent with overall goals of reliability
119 and efficiency. In this case, that means that we try to avoid switching the same
120 call multiple times. If a call passes from a CLEC's switch, to the Verizon tandem,
121 to the Verizon end office, and on to an end-user, that is somewhat less efficient
122 than if it goes straight from the CLEC to the Verizon end office, without passing
123 through (and using the capacity of) the Verizon tandem. Therefore, where there
124 is a significant level of traffic, the sound practice is to establish direct trunking to
125 bypass the tandem. To maintain the capability to provide interconnection to all
126 requesting carriers while maintaining efficiency levels of the network and
127 avoiding tandem exhaust, then, Verizon must establish a limit to tandem trunking.

128 **Q. Why is Verizon's proposed limit of 240 tandem interconnection and the use**
129 **of DEOTS in section 2.2.6 (which appears as a deletion from section 2.3 of**
130 **Marion's redline version) of the Interconnection Attachment of the ICA**
131 **reasonable?**

132
133 **A.** A limit of 240 interconnection trunks per CLEC is reasonable because of the size
134 of the tandem that serves Marion and the population density levels in southern
135 Illinois. Verizon's network end office switches, host/remote switches and
136 tandems were specifically designed for the market density levels in the Marion
137 service area of Illinois. In other words, for network efficiency purposes, the
138 tandems have been sized to meet the demands of the relatively less dense area
139 in and around Marion. For example, for Verizon's tandems in LATA 362 in Illinois
140 that serve the Marion area, Carbondale and Sparta, using data as of December
141 2006, the Carbondale 51T Tandem has a market density of "Rural" and has
142 ***[Start Confidential] [End**
143 **Confidential]*** trunks; the Sparta 50T Tandem has a market density of "Rural",
144 with ***[Start Confidential] [End**
145 **Confidential]*** trunks. For perspective, a current tandem in an "Urban" market
146 density area of New Jersey has a capacity of ***[Start Confidential]**
147 **..... [End Confidential]*** trunks. In sum, the
148 equipment serving a relatively low-density area such as southern Illinois is
149 engineered to provide less capacity than would be necessary in a more urban
150 area. But in either case, the equipment is designed to suit an efficient network
151 configuration, and does not provide excess capacity.

152 **Q. How does the 240-trunk limit compare with the actual usage needs of**
153 **Illinois carriers?**
154

155 A. ~~As it turns out, most carriers actually use considerably fewer than 240 local~~
156 trunks per tandem. As of December 2006, ***[Start Confidential]** **[End**
157 **Confidential]*** carriers have interconnection trunks in Illinois. These
158 interconnecting companies have a total of ***[Start Confidential]** **[End**
159 **Confidential]*** trunk groups and ***[Start Confidential]** **[End**
160 **Confidential]*** working trunks/DSOs to Verizon's tandems. There is an average
161 of ***[Start Confidential]** **[End Confidential]*** working trunks/DSOs per trunk
162 group. Most CLECs request at least 2 trunk groups -- one for primary traffic and
163 the other for overflow traffic -- so these 2 groups average to ***[Start Confidential]**
164**[End Confidential]*** working trunks/DSOs to the tandem. Verizon's limit of
165 240 interconnection trunks to its tandems in Illinois represents more than double
166 the average of current working trunks per interconnecting carrier, so it is plainly
167 reasonable.

168 **Q. How does the 240 tandem trunk limit help maintaining the efficiency and**
169 **reliability of Verizon's network?**
170

171 A. Tandem trunk capacity is scarce. Given the number of interconnecting carriers
172 and the volume of Verizon's end users, the 240 trunk limit is necessary for
173 Verizon engineering to maximize its tandem resources to maintain the quality of
174 the services it provides to both wholesale and retail customers.
175

The 240 tandem trunk limit and the use of DEOTs where they are justified by the volume of traffic allow Verizon to manage smaller tandems in lower-density areas

to achieve the highest degree of network efficiency, and to ensure that interconnection ports are available to all requesting carriers. The 240 limit accommodates twice the current average number of working trunks that carriers today maintain.

Q. Are there exceptions to the interconnection limit of 240 Interconnection trunks?

A. Yes, the parties may agree to change the limit. Section 2.2.6 of the ICA states "Except as otherwise agreed in writing by the Parties, the total number of Tandem interconnection trunks.... will be limited to a maximum of 240 trunks." Historically, parties rely on this exception when the 240 trunk limit has been reached, the trunks are fully utilized, and traffic is continuing to grow.

Q. How should Issue 14 be resolved?

A. The ALJ and the Commission should reject Marion's proposed change to Section 2.3 of the Interconnection Attachment, thereby confirming Verizon's right to run its network efficiently, for the benefit of all network users.

ISSUE 15

Q. Do Marion and Verizon agree how Issue 15 should be framed?

A. No. Marion believes that the issue should be stated as follows:

In Section 3, "Alternative Interconnection Arrangements" of the Interconnection Attachment, should the attachment include a

204 section requiring Verizon to provide Metallic Interconnection for
205 Access to Unbundled Network Elements?
206

207 Verizon, on the other hand, states the issue as follows:

208 Should Marion be entitled to access unbundled loops by running
209 metallic cables (as opposed to fiber) directly from Marion's
210 premises into Verizon's central office, and then connecting those
211 metallic facilities directly to Verizon's main distribution frame?
212

213 **Q. Why is Verizon's statement of the issue more appropriate?**

214
215 **A.** Because it better describes Marion's actual proposal, at least as Marion has
216 explained its "metallic interconnection" request to representatives of Verizon.

217 **Q. What is Marion's position on this issue?**

218
219 **A.** While it is certainly not clear from the Marion's statement of the issue, its
220 proposed Section 3.2 at pages 8-14 of its Petition for Arbitration ("Petition"), or
221 the redlined version of the model ICA submitted with its Petition, I understand
222 that Marion proposes to build metallic (copper) cables from its location into
223 Verizon's central office building via the cable vault, and connect directly to the
224 main distribution frame ("MDF") to gain access to unbundled loops. Marion's
225 proposal would thus circumvent the collocation arrangements that are the
226 industry standard for enabling CLEC access to ILEC loops.

227 **Q. Have you ever seen an arrangement such as the one Marion is proposing?**

228
229 **A.** No. In all my years at Verizon I have never seen or heard of an arrangement by
230 which a CLEC was given direct access to a Verizon MDF by directly connecting

231 metallic facilities. To do so would be simply unworkable from a technical
232 perspective, and more importantly from the perspective of safety.

233 **Q. What problems does Marion's metallic interconnection arrangement**
234 **present?**

235
236 A. Marion's proposal presents several operational and technical problems. It
237 violates the National Electric Code, it potentially exhausts main copper feeder
238 conduits that distribute "plain old telephone service" ("POTS") and digital
239 subscriber line ("DSL") service to Verizon and CLEC customers, and it introduces
240 unsuitable and unreliable metallic (versus fiber) cables for interoffice
241 connections.

242

243 Marion's proposal to build metallic facilities to connect to the copper within
244 Verizon's building means that Marion's equipment that will generate dial tone or
245 a modem signal must necessarily also generate a voltage. The NEC is violated
246 when the voltage on Marion's cables, generated from Marion's building power
247 source, enters the Verizon vault.

248 **Q. Are there risks associated with Marion's proposal?**

249

250 A. Yes. It would be risky for Marion to connect outside metallic facilities to the MDF.
251 Most importantly, this would pose a safety hazard to Verizon's people. It would
252 also pose a safety hazard to other carriers' equipment, and could cause
253 interference with other carriers' service.

254

255 **Q. How and why do those risks arise through Metallic Interconnection?**

256

257 A. Any copper cables entering the central office jeopardize the integrity and
258 reliability of the public switched network. Unlike fiber cables, copper cables are
259 highly conductive and pose an electrical safety risk for Verizon's employees, its
260 telecommunications equipment and the equipment of other CLECs that may be
261 collocated in the central office. Placement of a CLEC's copper cable in the
262 central office exposes everything in the central office -- equipment and people --
263 to the very real risk of hazardous stray voltage generated anywhere along the
264 entire external route of the copper cable. Thus, an electrical fault, short, induced
265 current, or lightning strike anywhere along Marion's copper route would instantly
266 be carried into the central office with potentially serious consequences for life and
267 property. Verizon's documented standards and procedures address these
268 electrical safety risks since all copper facilities that enter and exit Verizon's
269 central offices are directly sourced by Verizon's power plants.

270
271 Verizon has never implemented Marion's proposed interconnection configuration,
272 but some examples of the expected harms include:

- 273 (a) foreign voltages and currents of significant magnitude can reach the
274 protector frame area;
- 275 (b) disturbances can, via electromagnetic induction, reach and damage
276 Verizon's or Marion's' equipment, causing service interruptions;
- 277 (c) copper cable heating can be of significant magnitude and cause fire;
- 278 (d) foreign voltages can affect the calculated "ground potential" for a central
279 office, where the "ground potential" is engineered to nullify the effects of a
280 lightning strike (or other spikes in current) on Verizon's central offices.
281 Any foreign voltage's disturbance to the designed "ground potential" may
282 leave Verizon's central offices and equipment exposed to undue damage
283 from lightning strikes. Such disturbances can damage equipment damage
284 and cause service interruptions in unrelated telecommunications

285 equipment.

286

287 **Q. Do the usual collocation arrangements pose any of the safety risks of**
288 **metallic interconnection mentioned above?**

289

290 A. No, because Verizon's collocation options require that the CLEC provide fiber
291 interconnection to its collocation arrangement. In fact, none of the cable providing
292 any current CLEC interconnection with Verizon's network contains any metallic
293 elements, and it is therefore dielectric, or non-conducting. In addition, Verizon
294 provides DC power to all CLEC equipment in Verizon's central offices, in
295 accordance with NEC standards.

296

297 **Q. Is there a concern that Marion's proposal violates the NEC?**

298

299 A. Yes. The National Electric Code ("NEC"), 2005 edition, Section 230.2 states, in
300 relevant part: "Number of Services – A building or other structure shall be
301 supplied by only one service unless permitted in 230.2 (A) through (D)"
302 Summarizing the exceptions, the NEC allows a second source only for
303 Emergency services (*i.e.*, fire pumps, emergency lighting), back-up power
304 systems (*i.e.*, generators), special occupancies (*i.e.*, multiple dwelling buildings),
305 capacity overloads, and additional services requirements (*i.e.*, Items that require
306 different rate schedules).

307

308 Marion's proposal violates the NEC because it introduces a foreign source of
309 electric current into Verizon's central office. Verizon's digital switching equipment
310 generates voltage over every copper cable that exits the central office. The

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258 reliability of the public switched network. Unlike fiber cables, copper cables are
259 highly conductive and pose an electrical safety risk for Verizon's employees, its
260 telecommunications equipment and the equipment of other CLECs that may be
261 collocated in the central office. Placement of a CLEC's copper cable in the
262 central office exposes everything in the central office -- equipment and people --
263 to the very real risk of hazardous stray voltage generated anywhere along the
264 entire external route of the copper cable. Thus, an electrical fault, short, induced
265 current, or lightning strike anywhere along Marion's copper route would instantly
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276 Verizon's or Marion's' equipment, causing service interruptions;
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279 office, where the "ground potential" is engineered to nullify the effects of a
280 lightning strike (or other spikes in current) on Verizon's central offices.
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302 systems (*i.e.*, generators), special occupancies (*i.e.*, multiple dwelling buildings),
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304 different rate schedules).
305
306

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309 electric current into Verizon's central office. Verizon's digital switching equipment
310 generates voltage over every copper cable that exits the central office. The

311 purpose of this voltage is to provide the customer a "dial tone" to signal that the
312 switch is ready to receive dialing, and to power the services that are offered over
313 the loop. This voltage is DC (direct current) and originates in the Verizon central
314 office where the Switch is located.

315
316 **Q. Leaving aside your safety concerns, are there technical and operational**
317 **issues with Marion's proposal?**

318
319 **A.** Yes. First, it is notable that all CLECs that interconnect with Verizon facilities in
320 Illinois do so via fiber interconnection. Second, Metallic facilities are bulky and
321 difficult to deal with. I am concerned that metallic interconnection would deprive
322 us of valuable and scarce space in our conduits and central offices. This would
323 be particularly troublesome if other CLECs were to adopt the terms that Marion
324 has proposed.

325
326 **Q. What purpose do main copper feeder conduits serve?**

327
328 **A.** Verizon's main copper feeder conduits are the primary conduits that distribute the
329 copper pairs to provide POTS and DSL services to every Verizon and CLEC
330 customer using Verizon's network. Considering that a minimum of 2 copper pairs
331 must connect to every Verizon or CLEC customer's home served by the central
332 office, these cables and conduits are voluminous. Several conduits that hold the
333 cables must leave the Verizon vault for this distribution.

334 **Q. How does Marion's metallic interconnection proposal increase the risk of**
335 **exhausting these conduits?**

336
337 **A.** Marion's customer base can be expected to grow, and so would its need for the

338 number of copper pairs if its proposal is adopted. Copper cables require more
339 conduit space than fiber cables. Therefore, Marion's proposal, if adopted, would
340 increasing the possibility of exhaust of central office primary feeder facilities
341 (conduit into the office) and the pressure to place new conduit.

342 **Q. Why does fiber cable lessen the chance for exhaustion and why is fiber**
343 **more suitable for Interconnection between buildings?**

344 **A.** Copper cable is a less efficient transmission medium than fiber optics. A 12 fiber
345 cable is commonly used for CLEC interconnection. This fiber cable is less than 1/2
346 inch in diameter, about the thickness of a ball-point pen. Just four of the 12
347 fibers are required to provide CLEC interconnection. These four fibers, when
348 connected at the minimum interoffice connection rate of OC3, will provide 2,016
349 DS0s (voice level services).
350

351
352 In contrast, to meet the equivalent of 2016 DS0s in copper, four "600 pair"
353 cables, totaling 2400 pairs, would have to be placed. The diameter of four 600
354 pair cables would equate to that of a tire for a small car, requiring a substantial
355 amount of additional conduit.

356 **Q. How does fiber compare with copper cable when it comes to growth**
357 **potential?**

358 **A.** There is really no comparison. When it is necessary to add additional voice
359 channels to metallic facilities, it is necessary to run additional cables. But when
360 more capacity is required of fiber facilities, upgraded equipment is simply placed
361 on either end of the existing fiber. Using the exact same four strands of fiber that
362

I described above, we could, just by modifying the terminal equipment, increase the capacity to OC-12 (8,000+ voice channels), OC-48 (32,000+ voice channels) or even OC-192 (129,000+ voice channels).

Utilizing copper to access unbundled loops depletes already scarce capacity within central office manholes, vaults, riser cables, overhead racks, etc. Allowing Marion to squander finite conduit space by utilizing copper would jeopardize Verizon's ability to provide service efficiently to its own retail customers, as well as interconnecting CLECs. As noted above, all CLECs that interconnect with Verizon facilities in Illinois do so via fiber interconnection. If Verizon were required to accommodate Marion's proposal and other carriers opted-into Marion's ICA, the conduit exhaust problem, as well as all of the other problems associated with Marion's ill-defined proposal, would be greatly exacerbated. Marion's proposal is extraordinary and would give it something else no one has.

Q. Are there other environmental factors that render fiber more suitable than copper for interconnection?

A. Yes, fiber produces a superior signal with better reliability and less maintenance than copper. Copper is a very conductive metal, which makes it vulnerable to electromagnetic interference, moisture and age degradation. Copper facilities, when introduced to electromagnetic interference or moisture, generate noisy or static-filled voice conversations for the customer. The need to guard against and fix these issues leads to additional maintenance and operational costs. For example, copper facilities require the use of special mechanical equipment that

387 maintains positive air pressure within the cables. Copper wire is literally a 19th
388 century technology, and for these reasons and others fiber has been industry
389 standard for many years.

390 **Q. Has the FCC provided any guidance on technical and operational concerns**
391 **that may arise with respect to certain types of interconnection?**

392
393 A. Yes. In its *Local Competition Order* at ¶ 203 (emphasis added), the Federal
394 Communications Commission ("FCC") stated that:

395 [L]egitimate threats to network reliability and security must be
396 considered in evaluating the technical feasibility of interconnection
397 or access to incumbent LEC networks. *Negative network reliability*
398 *effects are necessarily contrary to a finding of technical*
399 *feasibility....* Thus, with regard to network reliability and security, to
400 justify a refusal to provide interconnection or access at a point
401 requested by another carrier, incumbent LECs must prove to the
402 state commission, with clear and convincing evidence, that specific
403 and significant adverse impacts would result from the requested
404 interconnection and access.
405

406 Verizon's concerns enumerated above are the same types of concerns the FCC
407 contemplated in its *Local Competition Order* when evaluating whether an
408 interconnection proposal is technical feasible. Accordingly, Marion metallic
409 interconnection proposal should be rejected.

410 **Q. Has the Federal Communications Commission recognized that**
411 **interconnection utilizing copper facilities raises operational concerns?**

412
413 A. Yes, the FCC so recognized in its Expanded Interconnection proceedings. Some
414 carriers in that proceeding asked the FCC to require local exchange carriers to
415 allow interconnection with copper facilities. The FCC declined to do so, finding:

416 At least one party supported interconnection of non-fiber optic cable
417 facilities (e.g., copper coaxial cable) provided by third parties. A

number of the LECs, however, have argued that such a requirement is undesirable because it would make limited conduit and riser space available to technologies that are much less space efficient than fiber. Given the potential adverse effects of such interconnection on the availability of conduit and riser space, we believe that interconnection of non-fiber optic cable should be permitted only upon Commission approval of a showing that such interconnection would serve the public interest in a particular case.¹

Q. Have other state Commissions recognized that interconnection utilizing copper facilities raises operational concerns?

A. Yes. For example, I'm aware that the Massachusetts Department of Telecommunications and Energy ("DTE") rejected a request by Greater Media to interconnect via copper cables. Greater Media proposed to place a cross-connect panel (a "customer interface panel" or CIP) in Verizon's central office and to bring its copper there for termination by Bell Atlantic-Massachusetts on the CIP dedicated to Greater Media's use. The DTE found that Greater Media's proposal was not technically feasible based on the same types of network safety and reliability concerns outlined in this testimony.²

Q. Now that you've discussed some problems with Marion's proposal, what are its advantages?

A. I'm aware of no real benefit to Marion's proposal to access UNE loops by directly accessing the MDF through metallic facilities. At most, it might save Marion the cost of collocating at Verizon's premises. But Marion's proposal would produce no enhancement to its service, and no benefit to end-users. On the contrary, the

¹ See Order, Massachusetts DTE Docket 99-52, issued Sept. 24, 1999, at 50-62.

² *Expanded Interconnection with Local Telephone Company Facilities; Amendment of the Part 69 Allocation of General Support Facility Costs*, CC Docket Nos. 91-141, 92-222, Report and Order and Notice of Proposed Rule Making, ("Expanded Interconnection Order"), ¶ 99 (Oct. 19, 1992).

445 proposal would jeopardize Verizon's employees, it would place the public
446 switched telephone network at risk of damage and interference, and it would

447 unnecessarily consume scarce space, while at the same time locking in a
448 technically inferior and bandwidth-constrained technology that was state-of-the-
449 art in the century before last.

450
451 **Q. Leaving aside the safety hazards with the proposal, and leaving aside the**
452 **technical and operational issues you've discussed, please discuss the**
453 **specific language that Marion has proposed -- and in particular, is Marion's**
454 **"metallic interconnection" language in section 3.2 inconsistent with other**
455 **language proposed by Marion?**

456
457 **A.** Yes. Under Issue 15 on page 8 of Marion's Petition, "Manhole/Splicing
458 Restrictions", Marion's language indicates that Verizon can prohibit all equipment
459 and facilities, other than fiber optic cable, from entrance to its manholes." This
460 language appears to directly contradict a request for "metallic interconnection"
461 because it would allow Verizon to prohibit Marion from bringing copper or metallic
462 cables into its manholes, leaving only fiber optic cable as an alternative.

463
464 In addition, there are some items under "Description and Application of Rate
465 Elements -- (Non-Recurring Charges)" (Petition at 9) and "Local Network Access
466 Services Rates and Charges," (Petition at 12), that refer to metallic cable, but
467 they appear to be nothing more than isolated references to "rate elements" and
468 "rates". These "rate elements" and "rates" are not explained and do not appear
469 to relate to any ICA terms and conditions that would explain Marion's proposed
470 method of interconnection.

471

472

In short, Marion's metallic interconnection language is unworkable not just for

473

technical or operational reasons, but because it makes no sense in the context of

474

Marion's other ICA language.

475

Q. What else is wrong with the language of Marion's proposed Section 3.2, as drafted?

476

477

478

A. As I noted, none of Marion's filings clearly explain the sort of extraordinary

479

arrangement Marion seems to be requesting. For example, under the subsection

480

entitled "Equipment and Facilities," under the heading "Cable" (Petition at 8),

481

Marion states "Verizon is responsible for placing the CLEC's fire retardant riser

482

cable from the cable vault to the space. The term "space" is ambiguous and

483

could reference any point in the Verizon central office where metallic connections

484

could theoretically occur. This ambiguity will likely lead to disputes about the

485

meaning of the term.

486

Q. Did Marion and Verizon ever discuss the rates and terms and conditions that appear in Marion's proposed ICA language?

487

488

489

A. No.

490

Q. Would it be appropriate for the ALJ and the Commission to consider adopting the rate rates and terms and conditions that Marion has proposed?

491

492

493

494

A. My understanding is that the parties never discussed or negotiated the specific

495

rate elements, rates or other terms contained in Marion's proposed language.

496

Indeed, the Commission just recently considered and approved rates for

497

interconnection and unbundled network elements ("UNEs") for Verizon in its

498 order in Docket 00-0812 issued on May 3, 2006. Those are the only rate

499 elements and rates that should be incorporated into the ICA.

500

501 The Commission cannot adopt Marion's rate element and rate proposals
502 because there is no support for them whatsoever. Nor is there any support for
503 the other terms that Marion proposes should govern "metallic interconnection," if
504 adopted. The Commission should reject Marion's request for metallic
505 interconnection, as well as the proposed ICA language that Marion proposes to
506 implement that request. The only rates that should be incorporated into the
507 Agreement are the Commission-approved rates that appear in the Pricing
508 Attachment. In the unlikely event that the Commission approves Marion's
509 request for "metallic interconnection," only then would it be appropriate to have
510 further proceedings to set rates and establish terms for the new service.

511 **Q. Are there existing arrangements that would allow Marion to access**
512 **Verizon's Unbundled Network Elements?**

513
514 **A.** Yes. Marion can and should use the same arrangements all other CLECs
515 interconnecting with Verizon use for access to unbundled loops. Verizon offers
516 CLECs a number of interconnection options, including: (1) caged collocation, (2)
517 cageless collocation (3) cageless collocation open environment ("CCOE"), (4)
518 physical collocation and (5) virtual collocation. A CLEC can choose to physically
519 collocate in a Verizon central office in a secured cage, in a shared collocation
520 arrangement with another CLEC, a "cageless" collocation arrangement, and,
521 should central office space be exhausted, via adjacent collocation arrangements.

522 Cageless collocation is a form of physical collocation that allows the CLEC to
523 place its equipment in Verizon's central office space. Cageless collocation
524 allows a CLEC, using Verizon-approved third-party vendors, to install equipment
525 in single bay increments in an area designated by Verizon. The cageless
526 arrangement allows a CLEC to interconnect with Verizon's network elements
527 without having to incur the costs associated with full physical collocation in a
528 cage. In addition to physical collocation, virtual collocation arrangements are
529 also offered under Verizon North Inc. and Verizon South Inc. tariffs in Illinois.
530 See, e.g., Verizon North Inc. ILL.C.C. Tariff No. 12, section 2, and Verizon South
531 Inc. ILL.C.C. Tariff No. 6, Section 0, which adopts Verizon North's rates, rules,
532 and regulations. These options have been sufficient for all other CLECs and
533 Marion has given no reason why Verizon should create extraordinary new
534 arrangements just for Marion.

535 **Q. What is Verizon's recommendation with respect to Issue 15?**

536
537 **A.** The ALJ and the Commission should reject Marion's vague metallic
538 interconnection proposal and the ICA language that purports to support the
539 proposal. Marion's proposed, extraordinary arrangement is not technically
540 feasible, and it should not be forced upon Verizon.

541
542 Verizon provides Marion with a number of options for interconnecting with its
543 network to access unbundled loops. Marion, as do all other CLECS in Illinois,
544 has the ability to choose which option is the most cost effective and meets its

545 needs. The ALJ and the Commission should not allow Marion to jeopardize the
546 integrity and safety of the network and shift collocation costs to Verizon by
547 - adopting Marion's proposal to make Verizon responsible for connecting Marion
548 facilities directly to a Verizon MDF.

549 **ISSUE 18**
550

551 **Q. Do Marion and Verizon agree on the manner in which Issue 18 should be**
552 **framed?**

553
554 A. No. Marion believes that the issue should be stated as follows:

555 Under Sections 6.1.2 and 6.2.2 (Sub Loop) of the Network
556 Elements Attachment, is it reasonable to limit Marion Telephone's
557 distance from the FDI to within 100 feet?
558

559 Verizon, on the other hand, states the issue as follows:

560 Is Verizon entitled to restrict the length of new facilities that it must
561 install to connect Marion's TOPIC to Verizon's FDI?
562

563 **Q. Why is Verizon's statement of the issue more appropriate?**
564

565 A. Because Verizon's statement of the issue better reflects what Marion is actually
566 proposing, and the potential limitless burdens that Marion's proposal could
567 impose on Verizon.

568
569 **Q. What is your understanding of Marion's position on this issue?**
570

571 A. Marion does not want the ICA to include any restriction on the length of facilities
572 that will connect Marion's Telecommunications Outside Plant Interconnect
573 Cabinet ("TOPIC"), which will be owned by Marion and house equipment that will
574 enable Marion to access sub-loops, to Verizon's Feeder Distribution Interface

575 ("FDI"). To achieve this, Marion proposes deleting the words "100 feet" from
576 Sections 6.1.2 and 6.2.2 of the Network Elements Attachment to the Agreement
577 (pages 105 and 108 of the redlined version of the ICA filed with the Petition).

578 **Q. Why is it reasonable and appropriate to include a 100 foot limitation on the**
579 **length of facilities that connect Marion's TOPIC with Verizon's FDI?**

580
581 **A.** Verizon's proposed requirement is reasonable for two principal reasons. The first
582 arises from the technical characteristics of loops, and the second from Verizon's
583 need to limit the work it will do on behalf of a CLEC.

584 **Q. What about the technical characteristics of copper loops makes this limit**
585 **appropriate?**

586
587 **A.** This concern arises from inherent resistance and signal loss in copper loops.
588 When we design a particular loop, we design it with reference to its overall
589 length. For longer loops we must use heavier gauge copper, load coils, and the
590 like; for shorter loops we may avoid these expenses. The copper cable network
591 is designed using standardized Resistance Design criteria that were established
592 decades ago, and which are considered industry standard – so much so that the
593 quality of service standards adopted by many states require Verizon to meet
594 these criteria. The point of these Resistance Design criteria is to ensure that the
595 last customer served by a particular route of copper cable receives an adequate
596 signal.

597
598 If we go back later and lengthen a particular loop, it would throw off the
599 Resistance Design engineering that dictated the design of that loop. For

600 example, if I have a loop that is 17,700 feet long, and then I lengthen it to 18,100
601 feet, this would change the fundamental character of that loop, and I would need

602 to go back and re-engineer it. In this example, I would have to add load coils in
603 order to compensate for the extra length. (And I should note that adding those
604 load coils would hinder our ability to offer DSL to any customer served by that
605 facility). In addition, it could require some of the cable to be replaced with a
606 coarser gauge (for example, it could require us to use 24 gauge cable, instead of
607 26 gauge, for some portion of the length).

608
609 It is important to note that when we connect a TOPIC to the FDI, that connection
610 goes out *and* back, so that the connection adds double that distance to the length
611 of the loop. Thus, a 100 foot connection between the TOPIC and the FDI would
612 add 200 feet to the length of the loop, a 200 foot connection would add 400 feet
613 to the length of the loop, and so on. In my example above, where the loop is
614 17,700 feet, a 100-foot connection would require no change to the loop, because
615 the resulting overall length (17,900 feet) would remain within the same design
616 thresholds as the original loop. But a 200-foot connection, resulting in an overall
617 length of 18,100 feet, would, as I stated, require significant changes to the loop
618 design.

619
620 The CLEC – in this case Marion – should interconnect at the FDI with a facility
621 that does not introduce significant additional loop length, and at which there

remains a zero decibel loss. Any connection longer than 100 feet begins to add a significant length to the loop, and to the signal loss. Therefore, a CLEC should

not be able to require Verizon to accommodate such an overly-long connection.

Q. How does Verizon's need to limit the construction it does on behalf of a CLEC justify the 100-foot restriction?

A. Although I am not an attorney, it is my understanding that the Telecommunications Act of 1996 (the "Act") does not require Verizon to extend its network for the benefit of CLECs, but simply permits CLECs to interconnect at certain points "within the carrier's network." 47 U.S.C. §251(c)(2)(B). At a fairly short distance – 100 feet or less – we consider the connection between the TOPIC and the FDI to be analogous to a "jumper cable, which is the cable with which we connect a CLEC's collocation to the MDF inside our central office (even though the physical construction and appearance of this connection is essentially identical to the loop itself). More than 100 feet, and the connection begins to look much more like an extension of our facilities (and in particular our loop), and less like a jumper cable. As I understand it, Verizon is not required to extend its loops or other facilities for the benefit of CLECs.

In addition, the 100-foot limit helps to ensure that the path of the connection between the TOPIC and the FDI will fall within Verizon's existing right-of-way. Eliminating this requirement could require us to secure a new right-of-way on which to construct those additional facilities.

Q. What is your recommendation with respect to Issue 18?

646 .
647 A. The ALJ and the Commission should reject Marion's proposed deletion of the
648 works "100 feet" from Sections 6.1.2 and 6.2.2 of the Network Elements
649 Attachment to the ICA.

650 **CONCLUSION**

651 **Q. Does this complete your testimony?**

652 A. Yes, it does.